

# Mineral Industry Surveys

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## MAGNESIUM IN THE FIRST QUARTER 2000

Domestic production of primary magnesium in the first quarter of 2000 declined by 6% from that in the fourth quarter of 1999, according to the U.S. Geological Survey. Producers' stocks increased slightly and shipments were slightly lower than those in the fourth quarter of 1999.

Total magnesium exports in 1999 were 29,000 metric tons, a decrease of 18% from the total in 1998. Canada (73%), the Netherlands (8%), and Mexico (5%) were the principal destinations. Exports of magnesium through February 2000 were 27% less than those in the same period of 1999.

Total 1999 magnesium imports of 90,700 tons were 10% greater than the imports in 1998. Canada (59%), China (26%), Russia (23%), and Israel (18%) were the principal source countries. Most of the imports from Russia and Israel were pure metal, and most of the imports from Canada and China were magnesium alloys. Magnesium imports through February 2000 were about the same as those in the corresponding period of 1999.

Quoted prices of primary magnesium continued to decline slightly. Prices are shown in the following table.

	Units	Beginning of quarter	End of quarter
Metals Week U.S. spot Western	Dollars per pound	\$1.40-\$1.55	\$1.38-\$1.44
Metals Week U.S. spot dealer import	do.	1.25-1.32	1.18-1.25
Metals Week European free market	Dollars per metric ton	2,250-2,350	2,200-2,300
Metal Bulletin free market	do.	2,450-2,550	2,270-2,350
Metal Bulletin China free market	do.	1,520-1,570	1,520-1,570

The International Trade Administration (ITA) published preliminary results of its sunset reviews for antidumping and countervailing duties established for pure and alloy magnesium from Canada. As a result of the countervailing duty review, ITA determined that the net duty for pure and alloy magnesium from Norsk Hydro Canada Inc. was 1.84% ad valorem (U.S. Department of Commerce, 2000a). The ITA also decided that revocation of the antidumping duty order for pure magnesium was likely to lead to recurrence of dumping at a margin of 21% ad valorem, so the order remains in effect, although the current rate was established at 0% earlier (U.S. Department of Commerce, 2000b). Final results of both sunset reviews are scheduled to be published no later than June 27.

In April, the International Trade Commission (ITC) began 5-year reviews of the antidumping duty orders for magnesium from China and Russia, which were originally instituted in 1995. Interested parties are to submit comments to the ITC by May 23 (U.S. International Trade Commission, 2000).

In March, Australian Magnesium Corp. Pty. Ltd. (AMC) completed its feasibility study on construction of a new magnesium plant in Stanwell, Queensland. The study estimates that capital costs for a 96,000-ton-per-year plant would be \$759 million and that operating costs would be between 58.1 and 63.8 cents per pound. (The range in operating cost is based solely on varying exchange rates between Australian and U.S. dollars.) The company hopes to complete funding for the project by the third quarter of 2000. Also under a restructuring proposal, Queensland Metals Corp. Ltd. (QMC) will acquire Normandy Mining Ltd.'s 50% interest in AMC in exchange for 225 million shares of QMC. Once a commitment to commercialization of the AMC magnesium plant is made, these shares will be distributed to Normandy's shareholders. This transaction is expected to be voted on by QMC shareholders in late May (Queensland Metals Corp. Ltd., March 28, 2000, AMC feasibility study completed, accessed April 25, 2000, via <http://www.normandy.com.au>; Queensland Metals Corp. Ltd., April 5, 2000, AMC ownership optimised, accessed April 25,

2000, via <http://www.normandy.com.au>).

Australia's Pima Mining Co. reported that it raised \$3.5 million for further development of a proposed magnesium plant by placing 18.2 million shares to institutional investors. The company, through its 80%-owned Samag subsidiary, plans to construct a 52,500-ton-per-year primary magnesium plant in Port Augusta, South Australia, using technology acquired from Dow Chemical Co. Samag is in the final stages of selecting design engineers and construction contractors. Samag expects to complete funding and offtake agreements by June so that initial plant production can begin by mid-2003. An earlier feasibility study for the project indicated that the capital cost for the plant would be \$375 million, and the operating cost would be less than 60 cents per pound of magnesium (Metal Bulletin, 2000b).

Norsk Hydro A/S announced that it would build a magnesium alloy facility in China. Annual production capacity of the plant will be 5,000 tons, and it will use magnesium produced in China as the feed material. Norsk Hydro plans to have the plant, which will be located in Xian, operational by late 2000 or early 2001. Alloy ingot produced at the plant will be marketed to Norsk Hydro's customers throughout the world (Norsk Hydro A/S, April 20, 2000, Hydro Magnesium goes to China, accessed April 21, 2000, via <http://www.hydro.com>).

China's Ningxia Metal Magnesium Works announced that it would declare bankruptcy by yearend 2000 and would keep its plant shut throughout the year. The plant had been closed in March 1999 because of a state-ordered restructuring and had not reopened because of a weak market. The company is looking for potential buyers for the plant (Platt's Metals Week, 2000c).

Canada's Cassiar Magnesium Inc. (formerly Cassiar Mines & Metals Inc.) reportedly expects to complete a feasibility study on its planned magnesium project by the end of 2000. The company hopes to construct a 90,000-ton-per-year primary magnesium facility in British Columbia by 2003. Cassiar Magnesium plans to present the study results to Aluminium of Korea Ltd. (Koralu), with which it has a memorandum of understanding for an initial investment (see Magnesium in the Second Quarter 1999). If, after assessing the study results, Koralu opts to fund the \$600 million project, it will have the option to acquire a 65% stake in the plant (Metal Bulletin, 2000a).

Israel's Dead Sea Magnesium was qualified by DaimlerChrysler Corp. to supply magnesium alloys AZ91D, AM50A, and AM60B for use by all of the company's diecasters and is in the initial stages of negotiating with General Motors Corp.(GM) to supply it with magnesium alloys. Dead Sea Magnesium also is in the process of increasing production at the facility in 2000 to 30,000 tons of magnesium metal and 24,000 tons of magnesium alloys, and the company is proceeding with the construction of its direct-chill caster for producing magnesium T-bar ingot (Platt's Metals Week, 2000a).

Russia's Uralasbest, the country's largest asbestos producer, announced that it plans to construct a 50,000-ton-per-year primary magnesium plant using tailings from the company's asbestos production as its magnesium source. Uralasbest reportedly has constructed a pilot plant based on technology developed at the Solikamsk magnesium plant to recover the magnesium from the tailings, which contain about 24% magnesium. Cost of building a commercial-scale plant is estimated to be about \$300 million, and the regional government is planning to issue recommendations on

the proposal (Interfax Mining & Metals Report, 2000).

The Swiss ferroalloys producer, Xstrata AG announced that it reached an agreement to acquire the Magnesium Services International fluxless magnesium recycling technology, which produces secondary magnesium diecasting alloys using 100% scrap as the feed material. As a result, Xstrata has begun a feasibility study on the construction of a 25,000-ton-per-year magnesium recycling plant in the midwestern United States (Platt's Metals Week, 2000b).

The use of magnesium in automotive applications is continuing to grow. The magnesium content of the 2000 model year, North American-produced vehicles was estimated to be 3.63 kilograms, a 15% increase from the 1999 model year average of 3.17 kilograms. Ford Motor Co. plans to continue this growth trend by including magnesium instrument panel support beams in its F-series pickup trucks for the first time. This application is estimated to consume between 5,900 and 8,200 tons of magnesium annually, with each part weighing between 6.8 and 8.2 kilograms each. These beams are currently made of steel. Although no specific target year was set for the truck conversion, Ford is already beginning to install magnesium alloy instrument panel support beams in the 2001 models of its Explorer sport utility vehicle (Wrigley, 2000a).

Magnesium also has potential for other automotive applications. GM is interested in a metal hydride fuel cell system using powdered magnesium alloy for its new Precept vehicle, a high-mileage vehicle that uses a combination of electric motors and a small diesel engine. The Precept is the result of the Partnership for a New Generation of Vehicles, an effort backed by \$250 million in federal funding this year and \$980 million from GM, Ford, and DaimlerChrysler. The magnesium alloy metal hydride fuel system was developed by Energy Conversion Devices Inc.'s subsidiary Ovionics Battery Co. Because the hydrogen is stored as a solid rather than as a gas or liquid, the need for large storage tanks is eliminated (Wrigley, 2000b; <http://www.ovonic.com/hydrogen/technology.html>).

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TABLE 1  
U.S. IMPORTS FOR CONSUMPTION AND EXPORTS OF MAGNESIUM 1/

(Metric tons)

		2000			
		1999	January	February	January-February
Imports:					
Metal		26,900	2,110	1,660	3,770
Waste and scrap		6,780	707	724	1,430
Alloys (magnesium content)		56,500	5,490	4,110	9,600
Sheet, tubing, ribbons, wire, powder, and other (magnesium content)		593	113	38	151
Total		90,700	8,420	6,530	15,000
Exports:					
Metal		4,790	232	414	646
Waste and scrap		16,500	465	171	637
Alloys (gross weight)		2,760	425	507	931
Sheet, tubing, ribbons, wire, powder, and other (gross weight)		4,990	265	690	955
Total		29,000	1,390	1,780	3,170

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

Source: Bureau of the Census.